

Discovering Cells

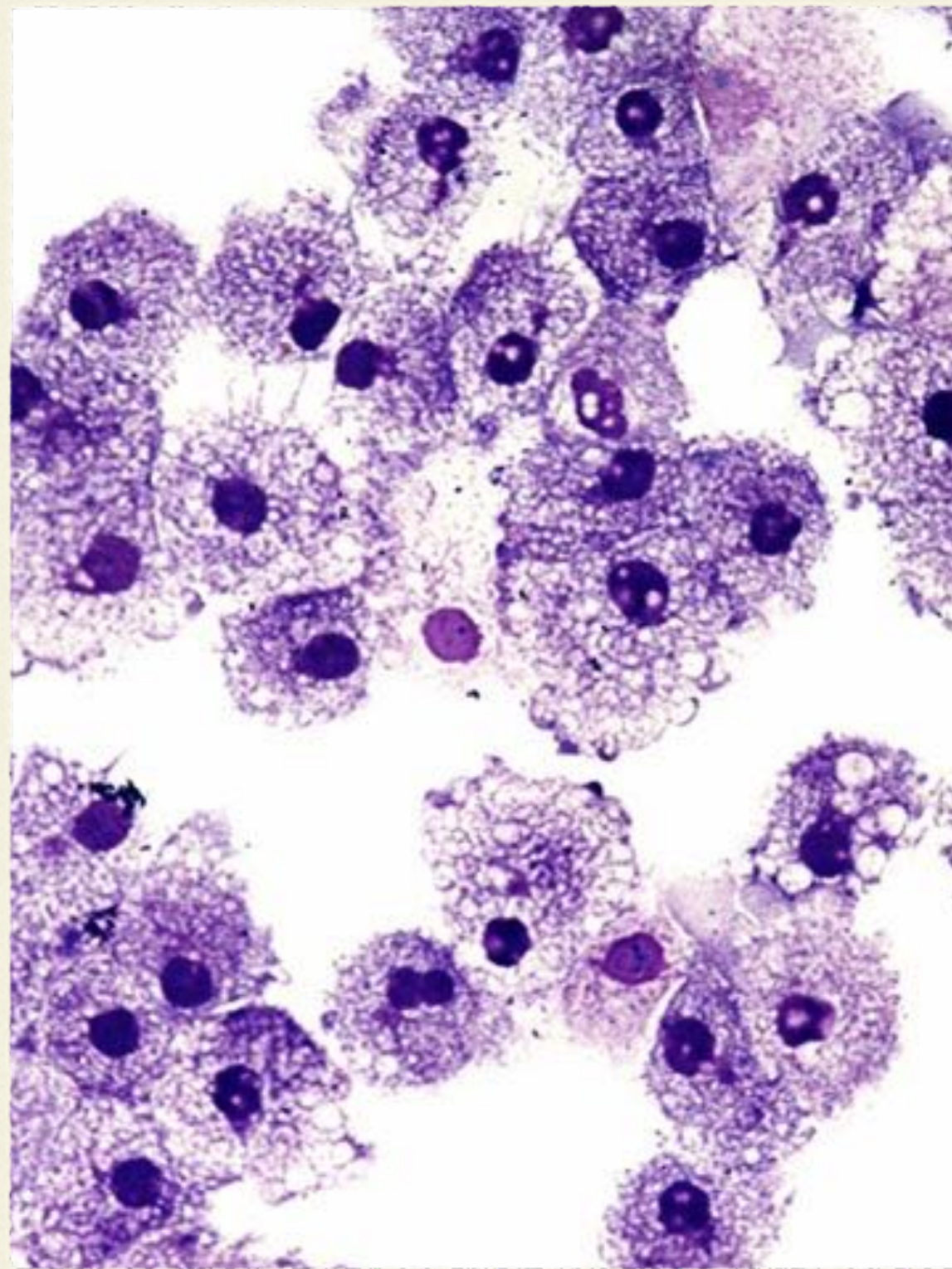
Introduction to Cellular Biology

An Overview of Cells

Cells are the basic unit of structure and function in living things. Most cells are too small to be seen with the naked eye.

Cells form the parts of an organism and carry out all of an organism's processes, or functions.





The structures of living things are determined by the amazing variety of ways in which cells are put together.

An organism's functions are the processes that enable it to stay alive and reproduce. Cells are involved in all the functions of living things.

First Observations of Cells



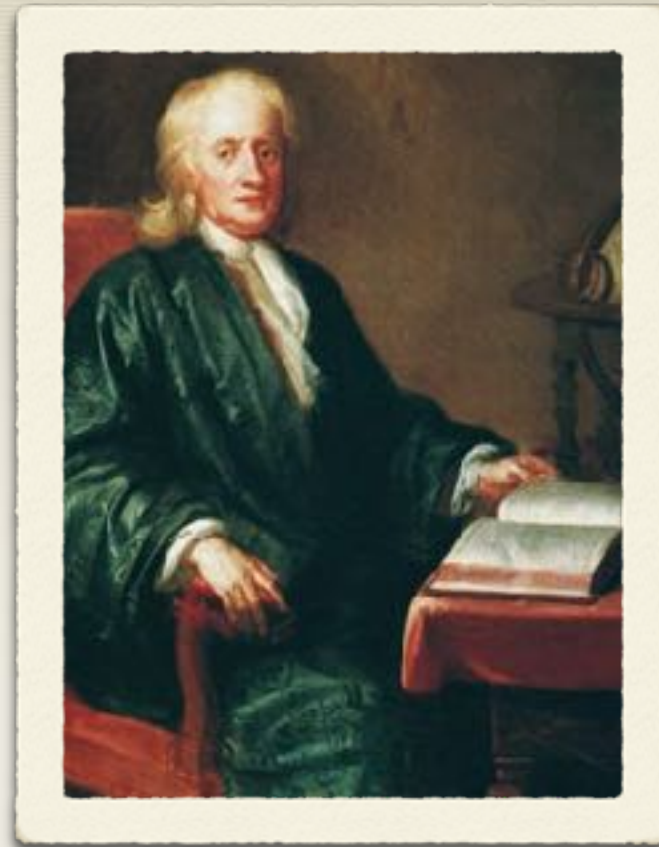
Around 1590, the invention of the microscope enabled people to look at very small objects. The invention of the microscope made it possible for people to discover and learn about cells.

A **microscope** is an instrument that makes small objects look larger. Some microscopes do this by using lenses to focus light. A simple microscope contains only one lens. A light microscope that has more than one lens is called a compound microscope.

One of the first people to observe cells was **Robert Hooke**. In 1663, Hooke observed the structure of a thin slice of cork using a compound microscope he had build himself.

At about the same time, **Anton van Leeuwenhoek** built simple microscopes and used them to observe tiny objects in rain water and from scrapings from teeth and gums.

Leeuwenhoek called the single-celled organisms he saw **animalcules**.



Robert Hooke



Anton van
Leeuwenhoek

Development of Cell Theory



Matthias Schleiden



Theodore Schwann



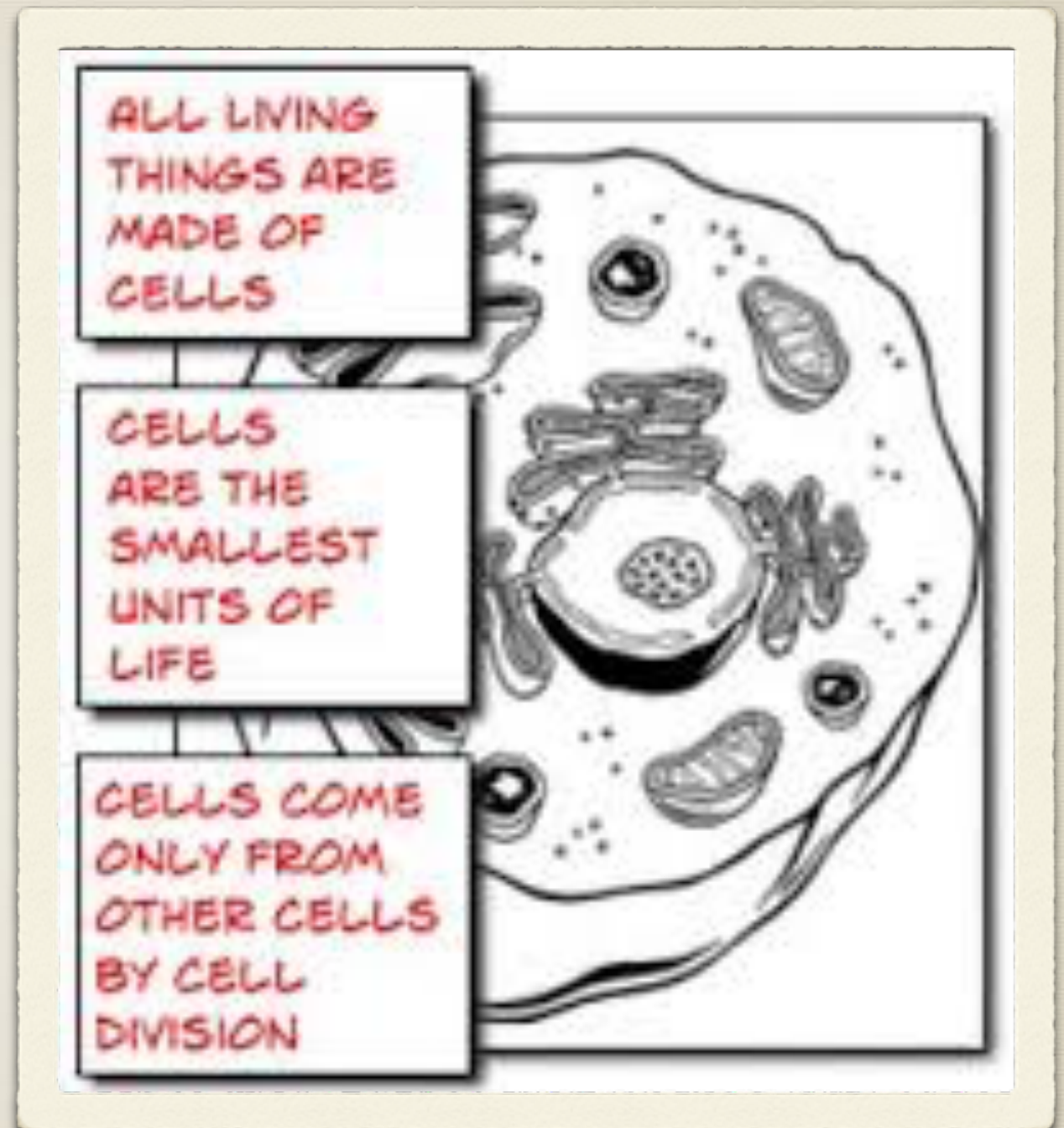
Rudolf Virchow

In 1838, **Matthias Schleiden** concluded that all plants are made of cells. The next year, **Theodor Schwann** concluded that all animals are also made up of cells. In 1855, **Rudolf Virchow** proposed that new cells are formed only from existing cells.

Schleiden, Schwann, Virchow, along with others help develop **the cell theory**.

The cell theory states:

- All living things are composed of cells
- Cells are the basic unit of structure and function in all living things
- All cells are produced from other cells.



Light Microscopes



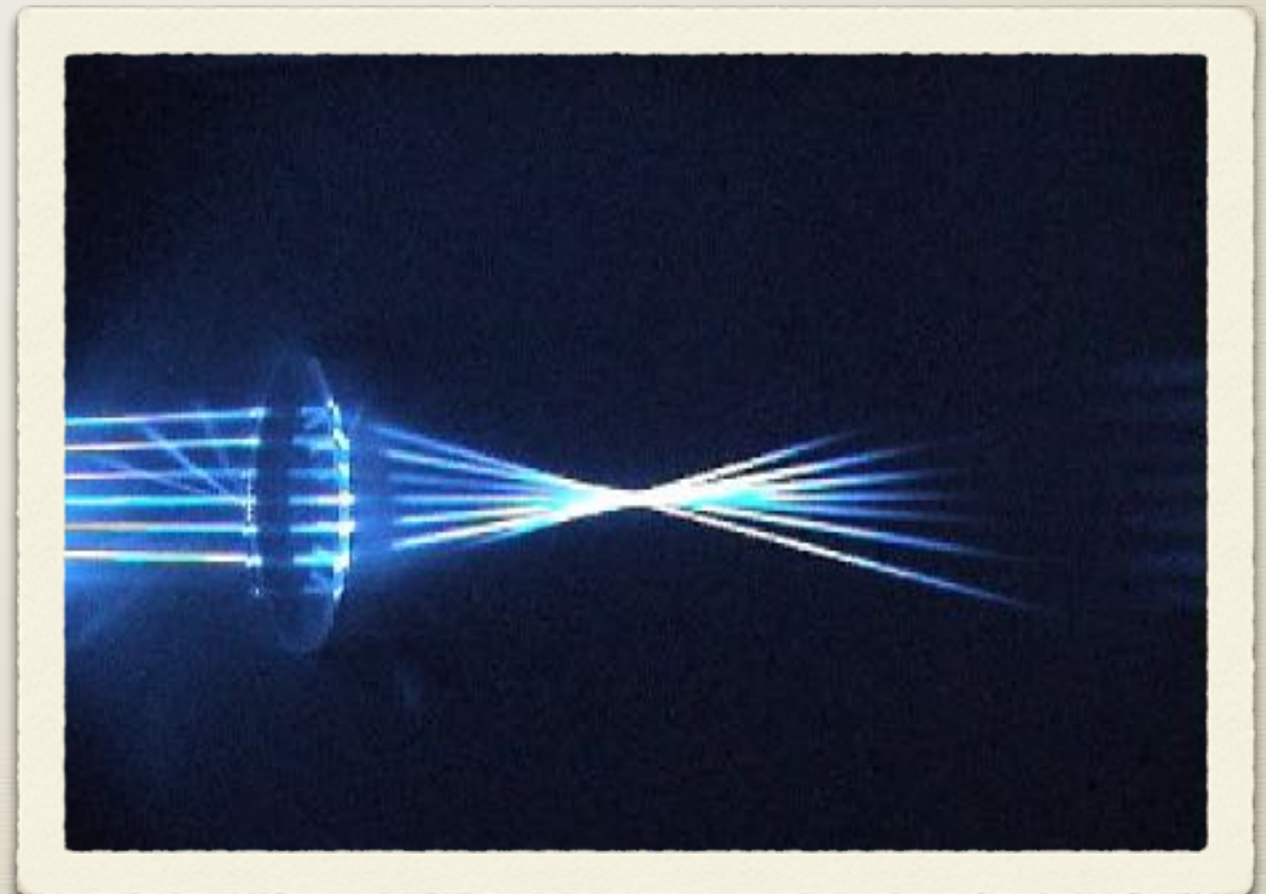
For a microscope to be useful, it must combine two important properties – magnification and resolution.

Magnification is the ability to make things look larger than they are. The lenses in light microscopes magnify an object

A lens that magnifies is thicker in the center than at the edges and is called a **convex lens**. Because a compound microscope uses more than one lens, it can magnify an object more than a simple microscope.

The total magnification of a compound microscope is equal to the magnification of the two lenses.

The ability to clearly distinguish the individual parts of an object is called **resolution**. Resolution is another term for the sharpness of an image.



Electron Microscopes

Since the 1930's, scientists have developed different types of electron microscopes.

Electron microscopes use a beam of electrons instead of light to produce the magnified image. These are used to see extremely small objects.

Because they use tiny electrons to produce images, the resolution of electron microscopes is much better than the resolution of a light microscope.



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Convex Lens - Lentes Convexas

The Cell Theory - La Teoría de la Célula

Magnification - Aumento

Resolution - Resolución